

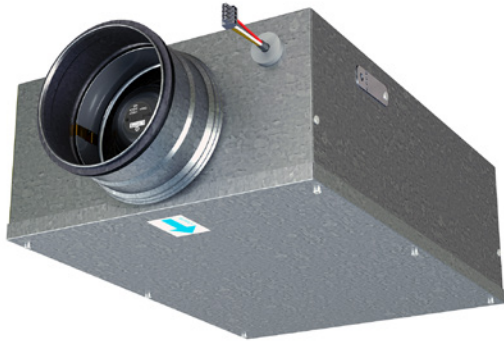
## Lindab **DBV**

Flow regulator for supply air



# Flow regulator for supply air

DBV



## Description

DBV is a volume flow regulator used for VAV regulation of the supply air in a terminal duct for an active chilled beam. Also suitable together with eg. wall diffusers.

DBV is equipped with a unique linear cone damper technology, which makes it possible to regulate up to 200 Pa with low sound level. The minimum air flow k-value at closed position is 0.73 (7.3 l/s at  $\Delta p_t = 100$  Pa).

The built-in VAV actuator is delivered pre-programmed with damper characteristic and in combination with a stable flow measurement over the damper, it makes the VAV regulation very accurate and reliable.

DBV can be installed directly in a terminal duct in front of the active chilled beam. DBV is not suited for exhaust air.

- Unique linear cone damper
- Low sound levels
- Stable flow measurements
- Reliable and accurate VAV regulation

## Order code

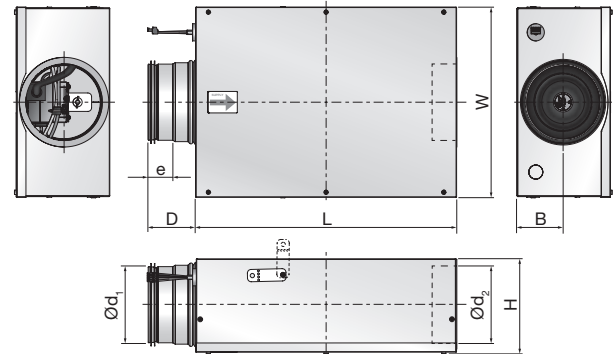
|  |            |                   |            |           |
|--|------------|-------------------|------------|-----------|
| <b>Product</b>   | <b>DBV</b> | <b>125</b>        | <b>125</b> | <b>MP</b> |
| <b>Type</b>  | DBV        |                   |            |           |
| <b>Duct connection <math>\varnothing d_1</math></b>    |            | $\varnothing 125$ |            |           |
| <b>Diffuser dimension <math>\varnothing d_2</math></b> |            | $\varnothing 125$ |            |           |
| <b>Motor type</b>                                      | MP         |                   |            |           |

Example: DBV-125-125-MP

## Factory settings

|                 | Standard         | On request      |
|-----------------|------------------|-----------------|
| Min. air flow   | 0                | Other min. flow |
| Max. air flow   | $V_{nom}$ (7m/s) | Other max. flow |
| Control signal  | 2-10 V           | 0-10 V          |
| Feedback signal | Damper position  | Air flow        |

## Dimensions



| $\varnothing d_1$ | $\varnothing d_2$ | B  | D  | e    | H   | L   | W   | m    |
|-------------------|-------------------|----|----|------|-----|-----|-----|------|
| [mm]              |                   |    |    | [mm] |     |     |     | [kg] |
| 125               | 125               | 75 | 78 | 40   | 155 | 426 | 310 | 6,1  |

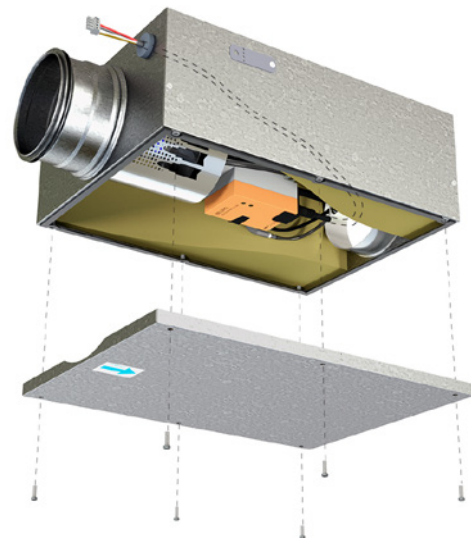
## Motortype

| Type    | Dokumentation                    |
|---------|----------------------------------|
| MP      | <a href="#">LHV-D3W-MP LIN</a>   |
| MOD/BAC | <a href="#">LHV-D3W-MOD LIN*</a> |
| KNX     | <a href="#">LHV-D3W-KNX LIN*</a> |

\* For the [MOD/BAC](#) & [KNX](#) variants see documentation for rotation version (LMV) of Belimo VAV-Compact-D3, as the MOD/KNX related information/signals is the same for the linear version (LHV).

## Maintenance

Easy access to inner parts. The motorized damper unit can be removed to enable cleaning of internal parts of the plenum box and gives access to the duct as well.



## Materials and finish

Materials: Galvanised steel  
Standard colour: Galvanised steel

The plenum box is available in other colours. Please contact Lindab's sales department for further information.

# Flow regulator for supply air

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## Technical data

### Settings

DBV is preset and calibrated from factory with the following air flow ( $V_{\text{nominal}}$ ) setting corresponding to a velocity of 7 m/s.

| $\varnothing d_1$<br>[mm] | $\varnothing d_2$<br>[mm] | $V_{\text{nom}}$<br>l/s | $V_{\text{nom}}$<br>m <sup>3</sup> /h |
|---------------------------|---------------------------|-------------------------|---------------------------------------|
| 125                       | 125                       | 86                      | 309                                   |

### Sound attenuation

Sound attenuation  $\Delta L$  of the unit with fully open damper, see table below.

| $\varnothing d_1$<br>[mm] | $\varnothing d_2$<br>[mm] | Centre frequency [Hz] |     |     |     |    |    |    |    |
|---------------------------|---------------------------|-----------------------|-----|-----|-----|----|----|----|----|
|                           |                           | 63                    | 125 | 250 | 500 | 1K | 2K | 4K | 8K |
| 125                       | 125                       | 10                    | 7   | 5   | 7   | 13 | 20 | 29 | 25 |

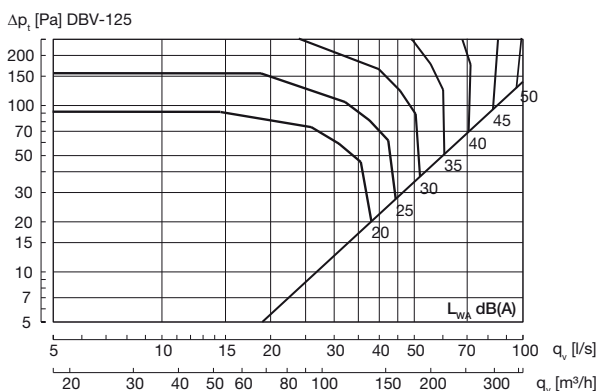
### Capacity

Air flow  $q_v$  [l/s] and [m<sup>3</sup>/h], total pressure  $\Delta p_t$  [Pa] and sound power level  $L_{\text{WA}}$  [dB(A)] for the duct (flow noise) can be seen in the diagram.

### Frequency-related sound power level

The sound power level in a frequency band is defined as  $L_{\text{Wok}} = L_{\text{WA}} + K_{\text{ok}} \cdot K_{\text{ok}}$  values are specified in the chart beneath the diagram.

### DBV-125



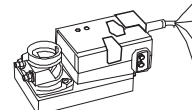
| Hz              | 63 | 125 | 250 | 500 | 1K | 2K  | 4K  | 8K  |
|-----------------|----|-----|-----|-----|----|-----|-----|-----|
| $K_{\text{ok}}$ | 8  | 5   | -1  | -2  | -6 | -10 | -14 | -13 |

### Airflow limits

| DBV                      | Lower regulation<br>limit (0.4 m/s) |        | Airflow Nominal<br>(7.0 m/s) |        |
|--------------------------|-------------------------------------|--------|------------------------------|--------|
| Inlet<br>Ød <sub>1</sub> | [l/s]                               | [m³/h] | [l/s]                        | [m³/h] |
| 125                      | 5                                   | 18     | 86                           | 310    |

## Type overview, MP versions

| Type          | Torque | Power consumption | Rating | Weight       |
|---------------|--------|-------------------|--------|--------------|
| LHV-D3-MP-LIN | 150 Nm | 2.5 W             | 4.5 VA | Approx 550 g |



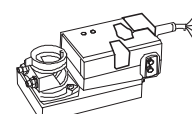
| No. | Designation             | Wire colour | Function                                     |
|-----|-------------------------|-------------|--|
| 1   | $\perp -$               | black       | AC/DC 24 V supply                            |
| 2   | $\sim +$                | red         |  |
| 3   | $\blacktriangleleft Y$  | white       | Reference signal / override / sensor         |
| 5   | $\blacktriangleright U$ | orange      | - Actual value signal<br>- MP bus connection |

### Note !

- Supply via safety isolating transformer !
- In conventionally controlled systems it is recommended that the connections 1 to 5 (PP) are led to accessible terminals (e.g. floor distributor) in order to allow remote access for diagnostics and service work.

## Type overview MOD versions

| Type           | Torque | Power consumption | Rating | Weight       |
|----------------|--------|-------------------|--------|--------------|
| LHV-D3-MOD-LIN | 150 Nm | 2.5 W             | 4.5 VA | Approx 550 g |



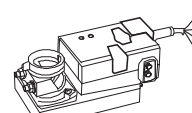
| No. | Designation               | Wire colour | Function                |
|-----|---------------------------|-------------|-------------------------|
| 1   | $\perp -$                 | black       | AC/DC 24 V supply       |
| 2   | $\sim +$                  | red         |                         |
| 3   |                           |             |                         |
| 5   | $\blacktriangleright$ MFT | orange      | MP connection           |
| 6   | D-                        | pink        | BACnet / Modbus (RS485) |
| 7   | D+                        | grey        |                         |

### Note !

- Supply via safety isolating transformer !
- Modbus signal assignment:  
 $C_1 = D- = A$   
 $C_2 = D+ = B$
- Supply and communication are not galvanically isolated.
- Connect earth signal for devices with one another.

## Type overview KNX versions

| Type           | Torque | Power consumption | Rating | Weight       |
|----------------|--------|-------------------|--------|--------------|
| LHV-D3-KNX-LIN | 150 Nm | 2.5 W             | 4.5 VA | Approx 550 g |



| No. | Designation               | Wire colour  | Function          |
|-----|---------------------------|--------------|-------------------|
| 1   | $\perp -$                 | black        | AC/DC 24 V supply |
| 2   | $\sim +$                  | red          |                   |
| 3   |                           |              |                   |
| 5   | $\blacktriangleright$ MFT | orange       | PP connection     |
| 6   | D+                        | pink > red   | KNX               |
| 7   | D-                        | grey > black |                   |

### Note !

- Supply via safety isolating transformer !
- Signal assignment KNX:  
 $D+ = \text{KNX+ (pink > red)}$   
 $D- = \text{KNX- (grey > black)}$
- The connection to the KNX line should take place via WAGO connection terminals 222/221.

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## Technical data

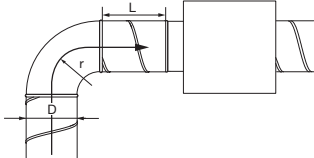
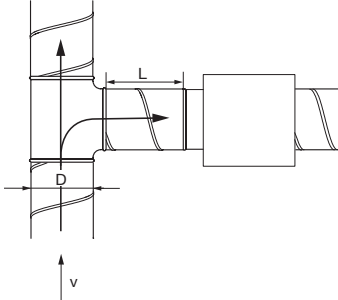
### Sound data table in frequencies

Sound power level  $L_{wa}$  [dB] in each octave band frequency for duct noise is shown in the table below for different combinations of air flow  $q_v$  in [l/s] or [m<sup>3</sup>/h] and total pressure loss  $\Delta p_t$  [Pa].

| Ød <sub>1</sub><br>[mm] | Ød <sub>2</sub><br>[Pa] | Duct velocity v = 2 m/s           |     |     |     |      |      |      |      |    | Duct velocity v = 3 m/s            |     |     |     |      |      |      |      |    | Duct velocity v = 4 m/s            |     |     |     |      |      |      |      |    |
|-------------------------|-------------------------|-----------------------------------|-----|-----|-----|------|------|------|------|----|------------------------------------|-----|-----|-----|------|------|------|------|----|------------------------------------|-----|-----|-----|------|------|------|------|----|
|                         |                         | Octave band feeqency [Hz]         |     |     |     |      |      |      |      |    | Octave band feeqency [Hz]          |     |     |     |      |      |      |      |    | Octave band feeqency [Hz]          |     |     |     |      |      |      |      |    |
|                         |                         | 63                                | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | A  | 63                                 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | A  | 63                                 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | A  |
| 125                     |                         | q <sub>v</sub> = 25 l/s / 88 m³/h |     |     |     |      |      |      |      |    | q <sub>v</sub> = 37 l/s / 133 m³/h |     |     |     |      |      |      |      |    | q <sub>v</sub> = 49 l/s / 177 m³/h |     |     |     |      |      |      |      |    |
|                         | 20*                     | 18                                | 18  | <15 | <15 | <15  | <15  | <15  | <15  | 23 | 25                                 | 20  | 18  | <15 | <15  | <15  | <15  | 19   | 30 | 33                                 | 28  | 26  | 23  | <15  | <15  | <15  | 27   |    |
|                         | 50                      | 26                                | 23  | 16  | 15  | <15  | <15  | <15  | <15  | 28 | 29                                 | 21  | 20  | 15  | <15  | <15  | <15  | 21   | 32 | 34                                 | 28  | 27  | 23  | <15  | <15  | <15  | 28   |    |
|                         | 100                     | 31                                | 24  | 20  | 17  | <15  | <15  | <15  | <15  | 33 | 32                                 | 25  | 24  | 19  | 15   | <15  | <15  | 25   | 35 | 36                                 | 29  | 28  | 24  | 17   | <15  | 15   | 29   |    |
|                         | 200                     | 33                                | 26  | 23  | 22  | 18   | 20   | 18   | 15   | 26 | 38                                 | 33  | 29  | 26  | 22   | 20   | 19   | 17   | 29 | 40                                 | 38  | 33  | 31  | 27   | 23   | 21   | 19   | 33 |
|                         | 300                     | 34                                | 27  | 25  | 24  | 21   | 23   | 21   | 19   | 29 | 39                                 | 33  | 29  | 26  | 23   | 22   | 20   | 19   | 30 | 41                                 | 39  | 34  | 31  | 28   | 25   | 23   | 22   | 34 |

### Air flow measurement

Recommended lengths  $L$  of straight duct between a disturbance and DBV.

|   |         |
|---|---------|
| <p>Bend with radius <math>r \geq D</math></p>    | 1D      |
| <p>Box installed at the side branch of the distribution duct;<br/>for velocities in the distribution duct <math>v \geq 4</math> m/s</p>  | 3D      |
| A general disturbance (none of the cases above)   | 1D - 4D |

### Accuracy

Damper position > 30% (Open = 100%)

The highest value of

7% of reading or 1% of  $V_{nom}$  (flow at 7 m/s)

Damper position < 30% (Open = 100%)

The highest value of

7% of reading or 2.5% of  $V_{nom}$  (flow at 7 m/s)

# Flow regulator for supply air

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## Sound dimensioning (simplified variant\*)

### Example 1:

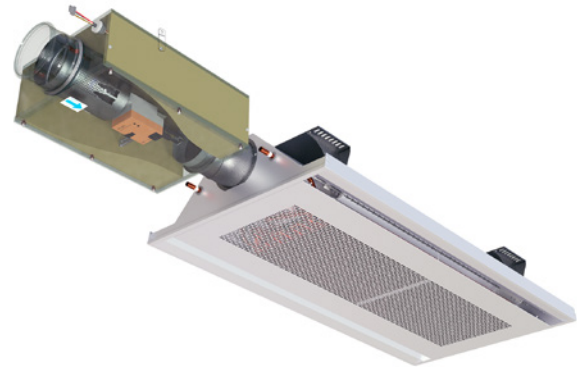
What is the sound power level  $L_{WA}$  in system where a Premax I-60-15-125-A1-2.4 is combined with a DBV-125-125 (in series)?

The primary airflow is  $q_a = 40$  l/s and the static nozzle pressure of Premax is 80 Pa.

### Answer:

Read of the sound power levels for DBV-125-125 in the diagram 2 and for Premax 2.4 m in the diagram 6 in Premax catalogue page 12, for  $q_a = 40$  l/s.

The value for DBV-125-125 from diagram 2 is  $L_{WA1} = 23$  dB(A).



Picture 6. DBV box and Premax chilled beam.

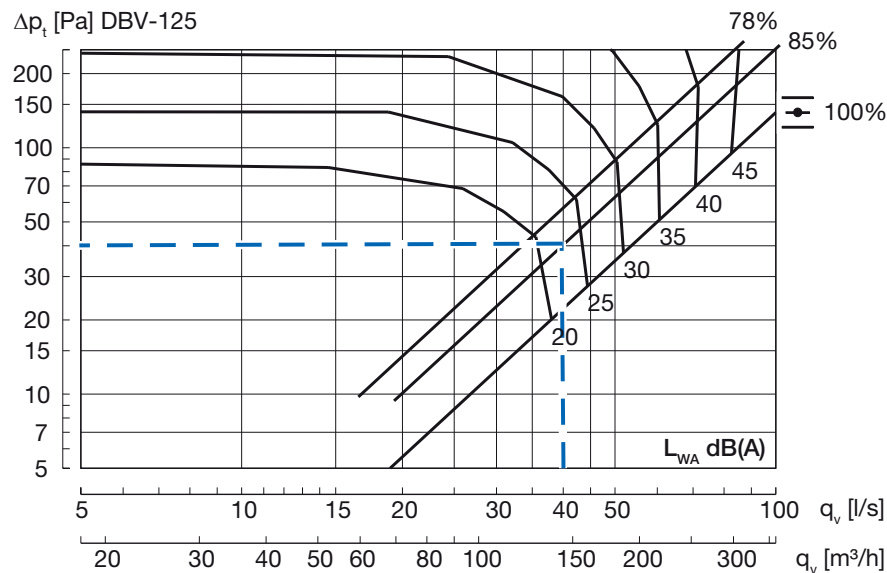


Diagram 2. Sound power level DBV-125  $L_{WA}$

The value for Premax I-60-15-125-A1-2.4 at 80 Pa  $L_{WA2} = 26$  dB(A).

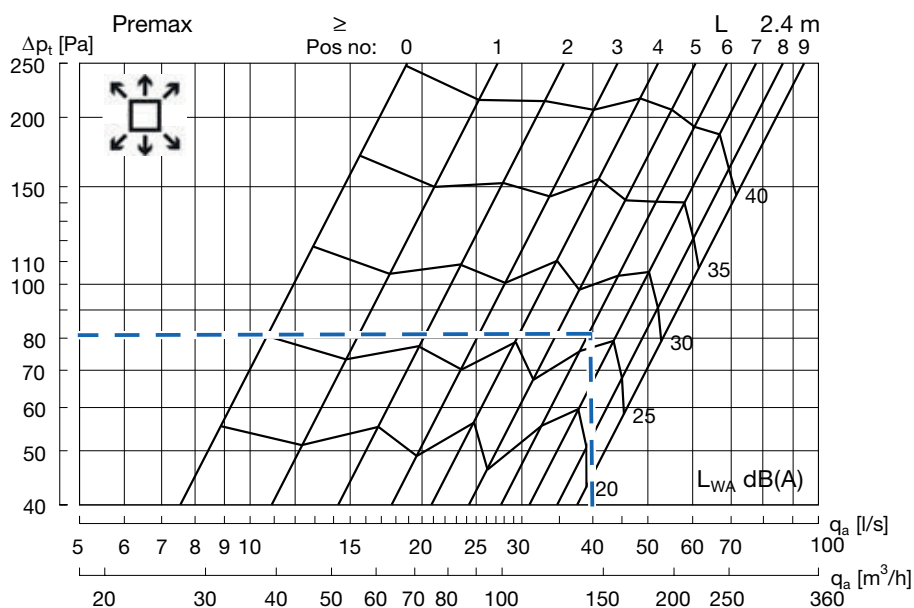


Diagram 3. Sound power level  $L_{WA}$  and JetCone setting for Premax  $L > 2,0$  m (taken out from Premax catalogue page 12, diagram 6).

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Instead of using the diagram, you can find the sound power level  $L_{WA}$  for you specific chilled beam design and all available types easily in our waterborne calculator on [www.lindQST.com](http://www.lindQST.com).

**Supply air beam**

Project name: Acoustic design

Description: Lindab's supply air beam Premax can be used for cooling, heating and ventilation. Water valves, actuators, Regula Secura, Regula Combi and Regula Connect can all be built into the Premax beam.

Premax features the Lindab JetCone, an innovative way of regulating the air volume. The air volume can easily be adjusted without having to worry about pressure and noise issues.

The Angled Nozzle system secures a perfect air spread pattern, available in a number of factory preset angles.

As a plus feature the Lindab AirGuide system offers readjustable air spread pattern control.

The Premax chilled beam is fully integratable with the Lindab eHybrid solution and together they provide optimal energy efficient solution.

- Powerful – exceptional cooling performance
- Flexibility – adapt to the individual workspace
- Control – innovations eliminating draughts

Order code:  
Premax I-60-12-125-A1-2.4-80-40

**Selected parameters**

Requirements:

|         |                      |                    |                |     |                   |
|---------|----------------------|--------------------|----------------|-----|-------------------|
| Primary | airflow              | rate               | Q <sub>h</sub> | 40  | l/s               |
| Primary | airflow              | rate               | Q <sub>h</sub> | 144 | m <sup>3</sup> /h |
| Static  | nozzle pressure loss | ΔP <sub>stat</sub> |                | 80  | Pa                |

Cooling

|                                      |                 |      |    |
|--------------------------------------|-----------------|------|----|
| Room air temperature                 | t <sub>r</sub>  | 25.0 | °C |
| Temperature gradient in room         | t <sub>g</sub>  | 0.0  | K  |
| Primary air temperature              | t <sub>ai</sub> | 18.0 | °C |
| Water inlet temperature              | t <sub>wi</sub> | 14.0 | °C |
| Temperature difference water circuit | t <sub>w</sub>  | 3.0  | K  |

**Results**

|                      |                 |    |       |
|----------------------|-----------------|----|-------|
| Sound power          | L <sub>wa</sub> | 26 | dB(A) |
| Sound pressure level | L <sub>p</sub>  | 22 | dB(A) |

Water flow rate: Q<sub>w</sub> = 0.109 l/s  
Corrected water capacity: P<sub>w</sub> = 1383 W  
Capacity air: P<sub>a</sub> = 336 W  
Total Capacity: P = 1719 W  
Pipe pressure drop loss: ΔP<sub>pw</sub> = 43.3 kPa  
Sound power: L<sub>wa</sub> = 26 dB(A)  
Sound pressure level: L<sub>p</sub> = 22 dB(A)  
Penetration length, horizontal: X<sub>p</sub> = 1.5 m  
JetCone setpoint's: 6+6+6+7  
Added pressure loss in connection: ΔP<sub>ch</sub> = 1 Pa  
Total air pressure loss in duct: ΔP<sub>t</sub> = 81 Pa  
Air volume / active meter: 68.6 m<sup>3</sup>/h  
Air volume / active meter Water capacity / active meter: 658 W/m

Picture 7. Extract from the waterborne calculator on lindQST.com.

Calculate the difference between the two sound power levels:

$$\Delta L_{WA} = L_{WA2} - L_{WA1} = 26 \text{ dB(A)} - 23 \text{ dB(A)} = 3 \text{ dB(A)}$$

Read off the increase from "Diagram 4. Logarithmic addition of two levels" and add it to the higher sound power level, here  $L_{WA2} = 26 \text{ dB(A)}$ .

Diagram 4 shows a value of approx. 1.75 dB(A), which must be added to the higher level  $L_{WA2} = 26 \text{ dB(A)}$ .

The result is a total sound power level of  $L_{WA} = 26 \text{ dB(A)} + 1.75 \text{ dB(A)} = 27.75 \text{ dB(A)}$ .

[dB] Increase to be added to the higher level

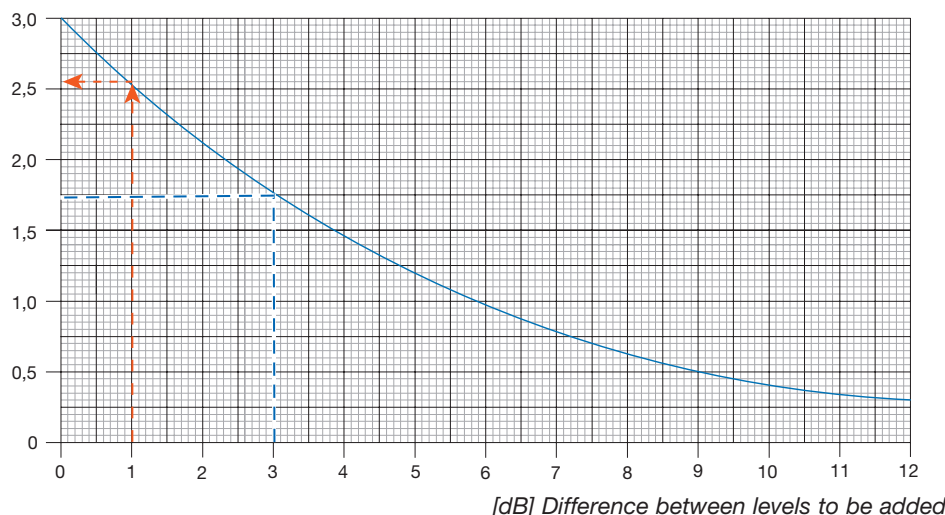


Diagram 4. Logarithmic addition of two sound levels.

NB! For any other combination with other Lindab active chilled beams please find the specific sound diagram in the corresponding product catalogue or in our waterborne calculator on [www.lindQST.com](http://www.lindQST.com).

\*We recommend a detailed sound calculation of the complete system! Please find detailed sound data in the product catalogues of DBV and the specific chilled beam type combined with.





Most of us spend the majority of our time indoors. Indoor climate is crucial to how we feel, how productive we are and if we stay healthy.

We at Lindab have therefore made it our most important objective to contribute to an indoor climate that improves people's lives. We do this by developing energy-efficient ventilation solutions and durable building products. We also aim to contribute to a better climate for our planet by working in a way that is sustainable for both people and the environment.

[Lindab](#) | For a better climate